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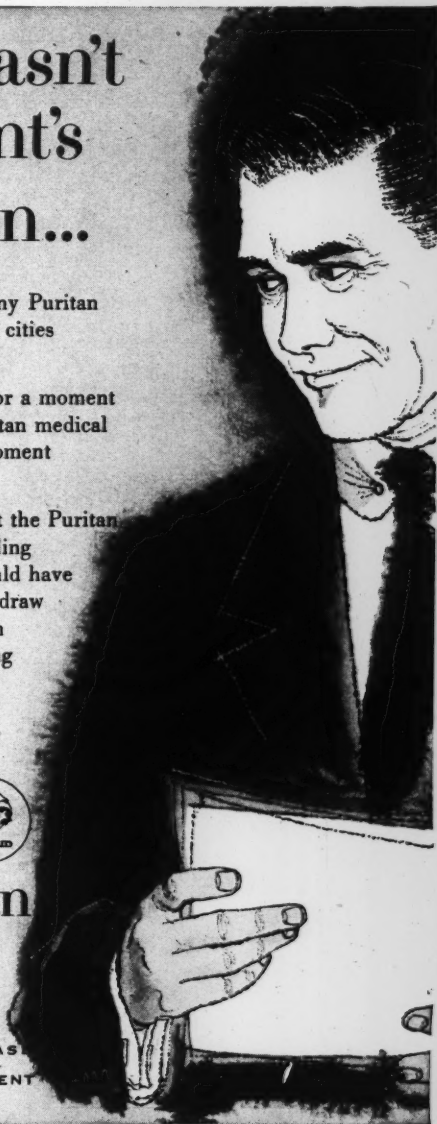
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AMERICAN ASSOCIATION OF INHALATION THERAPISTS

"Inhalation Therapy"

"Inhalation Therapy" is the official publication of the American Association of Inhalation Therapists, an organization of therapy technicians working in hospitals and for firms providing emergency therapy service. The Association is sponsored by the American College of Chest Physicians. Contents include news and information pertinent to the profession including medical research, operative techniques, and practical administration.

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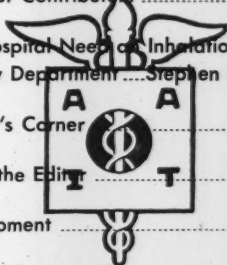
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EDITORIAL OFFICE
260 Crittenden Blvd.
Rochester 20, New York

Editor

JAMES F. WHITACRE

Managing Editor

ALBERT CARRIERE

ASSOCIATE EDITORS

DON E. GILBERT

M. E. GLASSER

HENRY J. LaPRAIRIE

JOHN CROWE

NOBLE PRICE

ADVERTISING and PRODUCTION OFFICES

332 South Michigan Ave.
Chicago 4, Illinois

Advertising Manager

PAUL MANDABACH

Production Manager

ELLIS MURPHY

GARETH B. GISH

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MARK V. CONLEY

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SISTER YVONNE

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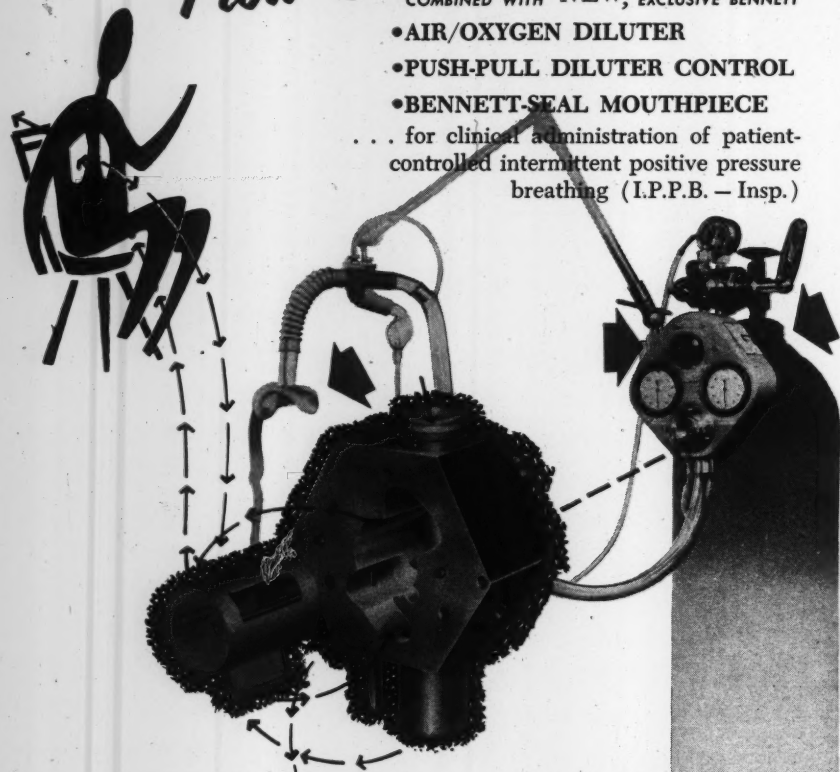
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Editorial

Training School News

FOR A NUMBER of years there has been an increasing awareness of the inadequacy of preparation of inhalation therapists coupled with the steady increase in complexity of inhalation therapy apparatus and techniques.

Most of our members have for a long time advocated some type of formalized training in addition to experience as a necessity for a good inhalation therapist, and it has been towards this end that the annual meetings of the A.A.I.T. have for the past six years included an intensive instruction period conducted by doctors most of whom are members of the American College of Chest Physicians. We have, of course, been fully cognizant of the fact that this brief course could hardly be expected to do what a longer training period could for a therapist, but time, money, physical facilities and other conditions have not been propitious for the initiation of any more long-range ambitious type of program up to this time.

In 1950, the Committee on Public Health Relations of the New York Academy of Medicine conducted a survey of existing practices in regard to inhalation therapy in hospitals as opposed to the available information on equipment and methods at the time, and found a woeful discrepancy. They made a report called the "Standards of Effective Administration of Inhalation Therapy," which appeared in the *Journal of the American Medical Association* September 2, 1950 (144:25); and using this as a beginning point, a joint committee of the N.Y. State Medical Society and the N.Y. State Society of Anesthesiologists began a long investigation into the problems involved. In April of this year they arrived at a set of "Essentials of an Acceptable School for Inhalation Therapy Technicians," which they resolved to submit to the Council on Education of the American Medical Association at its annual meeting in June.

These "Essentials" were embodied in a resolution (No. 12) presented to the House of Delegates of the American Medical Association at its June convention. The Reference Committee of the Council on Medical Education and Hospitals in its report approved the resolution in principle and recommended that it be referred to the Council for further consideration. This portion of the Committee's report was adopted by the House of Delegates.

The significance of this is that a set of educational standards for inhalation therapists is now being considered by the Council on Medical Education and Hospitals of the A.M.A. It is possible, and it is hoped, that action evolving from the initial work of the Council may eventually lead to the development of uniform standards of education and training for therapists and for the accrediting of training schools.

This represents a very active and progressive step in the right direction for the A.A.I.T., since the creation and adoption of such standards, whenever this may come about, will give all inhalation therapists, working together, an opportunity to bring greater respect to their profession. When

the time comes, we must do what we can to urge medical centers to inaugurate training programs and we must participate in every way we can—either as students or as instructors or assistants, depending on our experience and other qualifications.

JAMES F. WHITACRE, EDITOR

The suggested "Essentials of an Acceptable School for Inhalation Therapy Technicians" mentioned above appeared in the April 15th *New York State Journal of Medicine* (pages 1319-20), as a part of the report of the joint committee of which Dr. Vincent J. Collins was chairman. They are of such interest to all of us that they are reprinted in full here.

ESSENTIALS OF AN ACCEPTABLE SCHOOL FOR INHALATION THERAPY TECHNICIANS

I. Administration

A. Acceptable schools for training inhalation therapy technicians should be established only in medical schools and hospitals approved by the Council on Medical Education and Hospitals, of the American Medical Association or in colleges or universities affiliated with acceptable hospitals and accredited by the Association of American Universities or the respective regional association of colleges and secondary schools.

B. All training of technicians shall be under competent medical control.

C. Resources for continued operation of the school should be insured through regular budgets, gifts, or endowments but not entirely through students' tuition fees. Experience has shown that commercial schools operated for profit frequently do not adhere to proper ethical and educational standards and are not acceptable.

D. There must be available records of high school, college work, or other credentials of students. Attendance and grades of students together with a detailed analysis of their clinical experience shall be recorded, by means of which an exact knowledge may be obtained regarding each student's work.

II. Faculty

A. The school should have a competent teaching staff. The director should be a physician who has had specific training or experience in inhalation therapy acceptable to the Council. He shall take part in and be responsible for the actual conduct of the training course.

B. In clinical practice the enrollment shall not exceed four students to each instructor. In order to be considered as an instructor, a technician should have not less than three years of experience.

III. Facilities

A. Provision should be made for each student to receive clinical practice adequate in kind and amount under the supervision of the teaching staff.

B. Adequate equipment should be available for demonstration and clinical use. This should include all types of modalities in current accepted use.

C. Where affiliation with other hospitals is deemed necessary or important, it should be permitted only if adequate supervision is possible.

D. A library of adequate space and availability and containing up-to-date references, texts, and scientific periodicals pertaining to inhalation therapy should be maintained.

IV. Requirements for Admission

Candidates for admission should satisfy one of the following requirements:

1. Completion of four years of high school. Courses in biology, physics, chemistry, algebra, and geometry are recommended.

2. Passing of a college entrance examination for admission to an accredited college or university.

3. Graduation from a school of nursing recognized by the State board of nurse examiners.

V. Curriculum

A. Length of course should include not less than nine months of theoretic instruction and practical hospital experience.

B. Distribution of Time:			Qualifications of Instructors
Subject	Theory	Clock Hours Practice	
1. Applied sciences			
Anatomy	12	} M.D.
Bacteriology	12	
Chemistry	6	
Pathology	12	
Physiology	12	
Psychology	6	
Physics	10	
2. Procedures			
Analyzers and tests	6	6	} Inhalation therapist
Chambers and hoods	12	30	
Humidifiers and inhalators	6	9	
Humidity rooms	9	15	
Masks and catheters	12	21	
Nebulizers and aerosol	6	9	
Resuscitators and respirators	18	45	
Regulators and manifold	6	15	
Tents and incubators	15	30	
3. Inhalation therapy as applied to:			
Emergency	6	15	} M.D. for theory; qualified therapist for practice
Medicine	12	30	
Obstetrics	6	15	
Pediatrics	6	15	
Surgery, general	6	15	
Surgery, thoracic	6	15	
Surgery, neuro	3	15	
4. Ethics and administration	15	30	} Qualified therapist
5. Nursing arts		180°	} Qualified therapist
6. Clinical practice		470°	} Qualified Inhalation therapist
• Theory and practice.			
TOTALS (hours)	220	650	330

VI. Ethics

Exorbitant fees and commercial advertising should be considered unethical.

Schools conducted primarily for the purpose of substituting students for paid technicians will not be considered for approval.

VII. Admission to the Approved List

A. Application for approval of a school for inhalation therapy technicians should be made to the Council on Medical Education and Hospitals of the American Medical Association. Forms will be supplied for this purpose on request. They

should be completed by the administrator of the institution requesting approval.

B. Approval may be withdrawn whenever, in the opinion of the Council, a school does not maintain an educational program in accordance with the above standards.

C. An approved school should notify the Council whenever a change occurs in its directorship.

D. Approval may be withdrawn whenever a training program has not been in operation for two consecutive years.

Field Trips To Highlight AAIT ANNUAL MEETING

TWO OUTSTANDING field trips—one to a research laboratory and the other to the headquarters of a police emergency organization, will highlight the 1956 Annual Meeting of the American Association of Inhalation Therapists to be held in New York City during the week of November 12 through 16. Doctors, nationally known for the knowledge of problems and techniques related to inhalation therapy will report on the current developments and practices in the field, and commercial displays which will be open on the 13th, 14th, and 15th will bring those attending the session up to date on new therapy equipment.

Dr. Alvan Barach of the Presbyterian Hospital in New York with the aid of two of his co-workers, Drs. Beck and Bickerman, will present a series of lectures during the morning session on Wednesday, November 14. Dr. Barach will also speak at the Wednesday luncheon meeting. Wednesday evening all those registered for the lecture series will be invited to Presbyterian Hospital to visit Dr. Barach's research laboratory and to see demonstrations of some of the therapy equipment developed under his direction. Following this demonstration all attending will be taken on a tour of the hospital.

Tuesday, at lunch, Sgt. Felix Henratty, of the New York Police Department, will describe the operations of the Police Department's Oxygen Service Division. Tuesday evening a Field Trip through the

Service Division will give those attending an opportunity to see demonstrations of emergency equipment and techniques used by the policemen assigned to emergency resuscitation and related work.

As is customary at the association's annual meeting, the first day is to be divided into two basic sessions. One for the orientation of individual therapists who have not previously attended an annual meeting, lecture series or Institute of the AAIT, and another during which therapists and therapy technicians will present papers covering technical phases of the profession. Such topics as safety devices, common errors in therapy administration, clerical problems, and inventory control will be discussed. Association committees also will meet on Monday, and present their reports to the membership at the Business meeting on Friday.

Doctors to Lecture

Scientific and technical discussions will be presented each day by doctors well known for their work in inhalation therapy and related fields. Pressure breathing will be discussed by Dr. Peter A. Theodos of Philadelphia; Dr. Virginia Apgar of New York will speak on resuscitation; Dr. Edwin Levine of Chicago will describe the uses of inhalation therapy in controlling diseases of the chest; the physiological basis of inhalation therapy, aerosol therapy and bronchial drainage will be discussed respectively by Drs. Alvan L. Barach,

Hylan Bickerman and Gustav Beck all of New York; Dr. M. S. Segal of Boston will describe inhalation therapy treatment of smoke, gas and fume poisoning; Dr. Milton Levine of Ithaca, New York, will give a talk entitled "Bronchiolitis and Pneumonia in Infants and Children"; Dr. Albert H. Andrews of Chicago will talk on Inhalation Therapy in Acute Obstructive Diseases; Dr. Alvan Greer of Houston will discuss Tent Therapy and Dr. Charles LeTourneau of Chicago, will report on Oxygen Therapy and the Prevention of Retrolental Fibroplasia.

Prior to the business session on Friday, Dr. Edwin Emma of New York will give some suggestions for the qualifications of inhalation therapists, and Dr. Gordon Wyant of Saskatoon, Canada, will tell how to organize an inhalation therapy department. At the luncheon meeting on Friday Dr. Vincent Collins

of New York and Dr. Wyant and Dr. Greer will present a panel discussion on "Selling the Hospital Administrator an Inhalation Therapy Department." At the luncheon meeting on Thursday Lorraine Kratochvil R. N. of Chicago will discuss the relationship of nursing to inhalation therapy.

Additional Data

Fee for the lecture series, including five luncheon meetings, will be \$50.00 for non-members and \$40.00 for members. A printed program will be mailed to all members with their next newsletter and it will contain all data needed regarding rooms and rates. For additional information those interested can write directly to:

**Mr. Albert Carriere
Executive Director
American Association
of Inhalation Therapists
332 South Michigan Avenue
Chicago 4, Illinois**

Association News Briefs

Report on Tri-State Hospital Assembly

By NOBLE PRICE

The Tri-State Hospital Assembly met for its twenty-sixth annual session at the Palmer House in Chicago April 30th and May 1, 2 and 3, 1956. This gathering of hospital personnel comes actually from four of the mid-western states: Illinois, Indiana, Michigan and Wisconsin, and totals about 8000 people.

The various sections of hospital work are represented by the associations which comprise hospital staffs. Among these associations, of course, is the AAIT.

The program committee did an

excellent job in bringing outstanding speakers. Among the medical experts were Drs. Joseph B. Miller and Stuart Cullen. Dr. Miller came from Mobile, Alabama, while Dr. Cullen came from Iowa. Other speakers were Miss Lorraine Kratochvil and Mr. Stephen Johnson, both of Chicago.

Humidity Control

Dr. Miller discussed "Humidity Control" in his lecture. He pointed out the need for a wetting agent in

the treatment of various respiratory infections. Dr. Miller has done a great deal of research in this particular field. He provided slides with his lecture, showing the various methods of applying humidity. He pointed out the need for more than humidity alone. There is a need for an agent which can thin out the secretions and thus enable the patient to remove them from the bronchial tree.

An enlightening paper was read by Mr. Johnson (p. 14, this issue), dealing with the need for an inhalation therapy department in the hospital. His approach was concise and helpful. He showed without doubt that a well managed inhalation therapy department can be of great value to a hospital. He emphasized the need for qualified personnel to carry out a competent inhalation therapy program in the hospital.

Dr. Cullen, who is Associate Professor of Surgery and Anesthesiology at the University of Iowa, gave an interesting lecture on "Post-Operative Cardio-Pulmonary Col-

lapse." In the lecture, he set forth the various things involved in cardio-pulmonary collapse. Among the causes which contribute to this condition were obstruction of the airway, anesthesia, narcotics and pain.

Miss Krotochvil gave a most informative paper. She very aptly showed the relationship of the inhalation therapist to the nursing care of the patient.

After the presentation of this paper, a fine discussion was led by Mr. Newell of the American Ambulance and Oxygen Service.

The Executive Director of the AAIT gave a short report to the group and urged us to continue with our membership drive. The report indicates progress is being made with regard to the organization of local AAIT chapters, which is most gratifying.

I am sure all who came to the Tri-State Assembly this year were stimulated to greater effort for the advancement of inhalation therapy in their respective hospitals.

AMONG OUR CONTRIBUTORS

Stephen Johnson, author of "Does a Hospital Need an Inhalation Therapy Department?" is an anesthetist at St. John's Hospital in Springfield, Illinois. He gave this paper with modifications at the Tri-State Hospital Assembly in Chicago last May.

Robert Kruse is responsible for the fine photography on the next page. An active associate editor of "Inhalation Therapy," he is well on his way to becoming our official staff photographer. Mr. Kruse is

head of AAMED Rents of Oak Park, Illinois, and Secretary of the Chicago Chapter which is now in the process of organization.

Noble Price, our associate editor who has contributed the report on the recent Tri-State Hospital Assembly in Chicago is Chief Inhalation Therapist at Methodist Hospital in Indianapolis, Indiana. He is in charge of the "Association News Briefs" department and is also a member of the Board of Directors of AAIT.



Members of the Board of Directors attending are, left to right, standing: Lawrence Fruik, Noble Price and Don Gilbert; seated are Dorothy Braeger, Sisters Yvonne and Borromea.



Dr. Albert Andrews has an attentive listener in Dr. Stuart Cullen.

At right are Lorraine Kratochvil, Dr. Andrews and Lawrence Fruik.

This month's picture page is devoted to Inhalation Therapy sessions held at the Tri-State Hospital Assembly in Chicago during April and May of this year.



Dr. Joseph B. Miller with Dr. Edwin R. Levine at podium.



Does a Hospital Need An Inhalation Therapy Department?

By STEPHEN JOHNSON*

IT HAS SEEMED appropriate to re-emphasize the importance of observing standards in the everyday practice of inhalation therapy. The results of a survey of the practice of inhalation therapy in hospitals, which was done by the Committee on Public Health Relations of the New York Academy of Medicine, indicate a widespread discrepancy between information available concerning methods of administration and the actual conduct of this form of therapy.

The purpose of inhalation therapy in its broadest sense is described as the attempt to restore normal function to the respiratory system. Effective use of inhalation therapy in modern medical practice and modern or modernized institutions has shown itself of immeasurable value in the treatment of coronary artery disease, asthma, cardiac failure, atelectasis, marked emphysema, cerebral thrombosis, pulmonary edema and pneumonia, as well as in respiratory failures due to poisons and other causes—drowning, severe hemorrhage, shock, altitude sickness and war gas poisoning.

The most pronounced clinical signs are a diminution in cyanosis, pulse rate, dyspnea, restlessness and delirium, and a decrease in pulmonary ventilation volume.

Hospitals in general have not considered it feasible to supply trained technicians for inhalation therapy administration, and they usually relegate this menial chore, as it is considered, to the changing interne staff, or to nurses and orderlies, who in most cases have not had proper instruction. This lack of skilled technicians in many hospitals is responsible for inexpert management of the methods of treatment. The necessity for instructions and for technical departments in such institutions is exemplified by the following clinical illustrations and explanations: (Taken from Committee on P.H.R. Report mentioned above).

A patient with pulmonary emphysema was short of breath as a result of an upper respiratory infection. The patient was placed in an oxygen tent at a flow of 7 liters of oxygen per minute, with the canopy carefully tucked in on all sides, and the humidity and temperature within normal range. A concentration of 60% oxygen was obtained within an hour. However, the patient revealed an increased shortness of breath which was relieved quite promptly after the tent was removed. The previous existing dyspnea returned to the same degree present before the treatment. What was the cause of increased dyspnea with 60% oxygen?

*This paper was originally given before the Tri-State Hospital Assembly in Chicago, April 1956.

It was due to carbon dioxide concentration of 2.5% which resulted from the low flow rate of oxygen which gave an inadequate flushing-out of carbon dioxide. The patient's elimination of about 250 cc CO₂ per minute requires dilution to 2500 cc of air and oxygen per minute in order to lower the concentration of CO₂ to 1%, which is the accepted maximum. The tent thus needed twice as much entering gas (oxygen or oxygen plus air) per minute as was being used.

A patient with hypertensive vascular disease and coronary arteriosclerosis had acute widespread pulmonary edema at night. After treatment with a meter mask, providing an expiratory positive pressure of 5 centimeters of water, the lungs were clear at the end of one hour. The mask was removed, but within thirty minutes there was a return of pulmonary edema. What form of treatment was then indicated?

The patient was retreated with the meter mask, using the same positive pressure. When the moisture had cleared, the pressure was *gradually* decreased at the rate of one centimeter at half hour intervals. Under these circumstances the heart was offered a gradually increased volume of blood, so that left ventricular failure was not induced by the sudden entrance of a great amount of blood.

In establishing an inhalation therapy department, whether it be in a hospital of 100 beds or one of 500 beds, the actual setup will vary according to the needs of the individual institution, but certain essential functions will be common to all.

Department Head

A member of the regular medical staff who is either appointed by the administration or selected by his associates should be responsible for the department, and to him a technician or technicians should be assigned to carry out the methods and procedures; as in the case of the pathologist and his laboratory technicians, the radiologist and his X-ray technicians—thus designating two areas of responsibility: one medical and the other technical. The latter engulfs the supervision of the mechanical and clerical aspects of inhalation therapy.

The staff member in charge will act as a consultant to his colleagues, supervise the technicians in various phases, and work out general procedures that should become the rule. The logical man for this position would be the physician interested in respiratory physiology, one interested in the diseases of the chest or the anesthesiologist.

The inhalation therapist or technician has numerous duties and responsibilities. Let us follow a routine incident pertaining to the duties and method of administration with resulting effects for all individuals and departments concerned.

A patient enters the hospital and the physician has ordered a regimen of inhalation therapy. The nurse in the department notifies the inhalation therapist of this, and the technician at once goes to work. If the patient is conscious and can converse with the technician, the latter will visit and discuss points of the regimen with the patient. He will observe any possible idiosyncrasies the patient may have, in order to determine the type of equipment he will utilize in obtaining the physician's requirements of

therapy which will be most comfortable for the patient, and in response will probably receive from the patient his fullest cooperation and confidence. In this visit the therapist will also rearrange any furniture in the room, if necessary, so that when his equipment is brought in it can immediately be placed and therapy started.

The therapist, of course, has a knowledge of the equipment available at that given moment, for he records the number of units and uses and their return, and has seen to it that upon its previous return each piece of equipment has been cleaned, sterilized and repaired if necessary in order for it to be ready for immediate re-use.

Then the therapist installs the equipment efficiently and unhesitatingly. He placards the room and surrounding area as a safety factor by placing *No Smoking* signs, and instructs the patient as to the hazards and also the visitors and/or any other personnel in that range. By installing the equipment efficiently, he has safeguarded both the patient and the equipment; he has avoided any waste and he has eliminated breakage due to lack of knowledge of equipment.

The therapy having been started, the therapist has accurate records of the equipment used and its location. The floor personnel are instructed, pertaining to proper functioning, and requested that if this should in any way be impaired the Inhalation Therapy Department should immediately be notified. Inexperienced personnel should not tamper with the equipment.

When therapy is instituted the patient is automatically put on the therapist's list, and frequent visits are made to check the equipment, function and supply, observing that the physician's orders are being properly carried out, and reassuring the patient.

The therapist submits accurate daily charges to the credit department, and the punctuality of these charges aids the efficiency of that department. The possibility of the same patient's being charged

twice or the failure to submit a charge due to oversight or distraction is much smaller when the charging is done systematically by the inhalation therapy department than when some other department has to look after it.

At the conclusion of the regimen of therapy, the equipment is reclaimed by the therapist and checked against his list of equipment utilized for that patient, thus avoiding any loss or misplacement. It is then processed and stored until needed again.

National Fire Protection Association Pamphlet #565, section 11, *Handling of Gases*, charges administrations to provide regulations assuring the safe handling of combustible and combustion-supporting agents by hospital personnel. Identification, location, storage, special precautions for the handling of oxygen valves, regulators and cylinders, cylinder connections and transfilling are all subtopics of this section. With the careful study of this and other sections of the pamphlet and/or other provisions laid down by statutes or insurance underwriters, the therapist fulfills the administration's obligations to this charge and has placed the administration abreast of the recommendations of various authorities, who advocate the placing of all oxygen therapy, equipment control, safety and maintenance in the hands of one qualified and interested individual.

The economy, the minimizing of breakage and loss, the proper repairing, the continued good functioning, the safety factors observed and set forth, the satisfaction of the attending physician, the alleviation of the burden on the general nursing staff and its associates and the punctuality and correctness of



New Four Way Oxygen Therapy Mask

It's a universal mask because it can be used four ways: 1. *Reservoir* type mask; 2. *Straight Rebreathing* mask, by removing center valve cover between bag and face piece; 3. *Positive Pressure* mask, with accessory positive pressure valve; 4. *Supersaturated* oxygen therapy mask, with large bore tubing, no bag.

Fits any size face; imbedded wire inserts adapt mask to all facial contours. Has interchangeable valves, detachable bag, seamless reinforcements, exhalation shield for eyeglass wearers, stomach tube orifice. And the mask can be completely disassembled for sterilizing. Write for prices and descriptive literature.



Above, with accessory positive pressure valve.

Below, with large bore tubing, no bag.



NCG

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charges to the credit department, the reduction and prevention of fire hazards are all definite assets to administration.

A recent Linde Oxygen Therapy Bulletin cites the following figures for a typical 1500-bed hospital for the last six months of 1954:

1795 cases of oxygen therapy
641 were by tent, for a total of
2228 days
361 were by catheter or other
nasal apparatus, totaling
1028 days
107 were mask patients (all
types), totaling 205 days
145 infants in incubators for
441 days
323 infants in infant hoods for
992 days

From these figures we see that oxygen therapy is an important ancillary medical service in our hospitals today, and also that there is a fair consistency in the length of cases—averaging about 3 days for most types of therapy. Oxygen cases that used to last several weeks now usually only require several days. This indicates that the use of oxygen in combination with other medications, and better equipment with proper supervision have lessened the time required for adequate oxygen therapy. This shorter treatment does not impose the financial burden on the patient which the former protracted periods did.

Oxygen in the post anesthetic recovery room or for the post-anesthetic patient is of great importance, and should be handled by trained personnel:

Oxygen is the paramount inhalation therapy agent, but there are

other agents, such as: helium and oxygen mixtures, carbon dioxide and oxygen mixtures, nebulization of antibiotic aerosols, bronchodilators, wetting agents and mucolytic enzymes. These must also be considered as a part of inhalation therapy. The most common of these is a new detergent, superinone, commonly known to us as Alevaire®, and has already found widespread use in premature and newborn infants, croup, laryngitis, acute bronchiolitis, diphtheria, pertussis, poliomyelitis, asthma, emphysema, etc. It is also used in cases of respiratory damage due to burns and blasts, pre- and post-operative pulmonary complications such as tracheotomies, cardiovascular or cerebrovascular accidents, etc.

In conclusion, let us continually remind ourselves that although this life-sustaining element oxygen constitutes only 1/5 of the atmospheric air, we continually inhale and absolutely require it. This imposes upon us in the medical fields an obligation to see to it that all those placed in our charge shall be assured of it, by whatever supplemental or artificial means as may be necessary in cases where the normal means are deficient or interfered with.

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"Safety in Hospitals," Ohio Chemical Company
Linde Oxygen Therapy Bulletins, volume 13, numbers 1-10.

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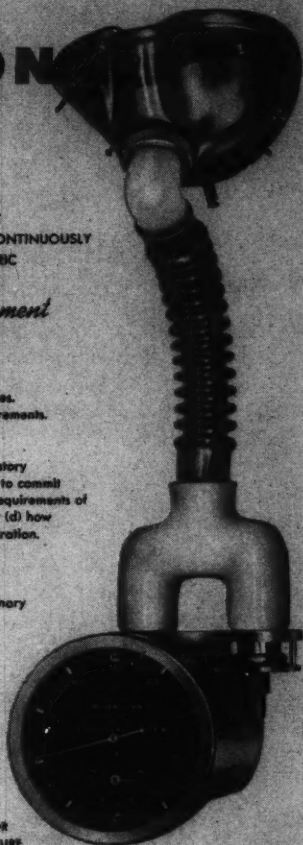
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THE EDITOR'S CORNER

It is our intention to establish this page as a regular feature of each issue of the journal, to be used by the Editor in discussing with our members and other readers some of the various problems associated with the publishing of the journal, subjects related to the A.A.I.T. or topics of general interest to people engaged in this field of work.



Apology

Through an oversight, credit was not given to the American College of Surgeons for permission to reprint the illustrations used with the article by Drs. Schwartz and Dale in our May issue. The article was original to us, but the two figures had already appeared with another article in the 1955 SURGICAL FORUM.

Letters

To help us express *your* views (as well as ours), please let us have your reactions to the subjects discussed on these pages.

We shall all learn more by exchanging ideas than we shall by having only one person, the Editor, write on the basis of his own limited experience. Letters to the Editor can be about anything which appears in this journal. All *signed* letters will be answered directly, and if of sufficient interest will be printed in the Letters to the Editor section.

New Book

Our readers will be interested in a new book on *Pulmonary Emphysema* by Drs. Barach, Bickerman et al, just published by Williams and Wilkins Co. this summer. One chapter, "Application of Respiratory Physiology to Therapeutic Procedures in Pulmonary Emphysema," appeared in the April *Journal of Chronic Diseases* and is abstracted here.

A detailed treatment of Hypoxia prefaces the remarks on its occurrence in emphysematous patients and their treatment. He then considers Changes Induced by Relief of Hypoxia, Sensitivity of Chemoreceptors to Arterial Hypoxia, various forms of hypoxia and methods of increasing resistance to it, including various drugs and such measures as thyroidectomy to lower the

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basal metabolic rate, etc.

After discussing Acclimatization to Hypoxia and Reflex Chemical Control of Respiration, Dr. Barach proceeds to develop the Physiologic Therapy in Pulmonary Emphysema, with sections on the use of helium and helium-oxygen mixtures, oxygen therapy techniques, and the clinical application of pressure breathing (both continuous and intermittent positive pressure).

Concerning helium-oxygen mixtures (80-20), he says that whereas the advent of adrenal cortex derivatives and bronchodilator aerosols has removed the need for more or less routine use of He-O₂ in such cases, it nevertheless affords a very considerable relief to the patient, especially when combined with pressure breathing.

Dr. Barach feels that if oxygen therapy is employed, continuous is much to be preferred to intermittent technique, and he outlines a program of gradually increasing liter/flow rates which permits the patient to get accustomed to the rising concentration without depression of the respiratory center.

It is frequently stated that the decrease in ventilation occasioned by oxygen therapy in emphysematous patients causes increased CO₂ retention. Barach says that this additional CO₂ retained does not necessarily cause a change in the blood pH, and that unless it does there is no cause for alarm. Further, he points out that after a few days of oxygen therapy, the lungs' efficiency usually improves, and the initial rise in CO₂ content of the blood is followed by a fall, because of better diffusion of CO₂ out of the lungs.

The oxygen tent is discussed as

a means of providing low-concentration therapy for these patients, by the expedient of using air injectors to avoid CO₂ accumulation in the tent. He emphasizes the point that without air injection, the tent is *not* a suitable form of therapy for these patients because of the danger of too high oxygen concentrations with 10 to 12 liters of oxygen, or CO₂ accumulation contingent on low liter flows of oxygen into the tent.

Pressure breathing must be used only with special precautions in patients with peripheral vascular failure. In cases of cardiac insufficiency, the decrease in blood entering the heart as a result of pressure breathing often causes an increased cardiac output where it was the left heart that was failing. This would be beneficial, but IPPB may *aggravate* insufficiency of the failing *right* heart in some cases.

An old but still reliable means of assessing whether the pressure breathing has adverse effects is that of measuring the patient's blood pressure during the treatment. If this falls more than 15 mm mercury, an injurious degree of pressure is probably being employed.

Dr. Barach stresses the point that unless there is a respiratory acidosis (patient's blood pH altered by the retained CO₂), there is no particular advantage to hyperventilating the patient in order to get rid of CO₂.

Various devices are described for providing continuous positive pressure of 5 to 8 cm of water, and it has been found that these are subjectively more pleasant for the patient than IPPB equipment which maintains a comparable mean pressure.



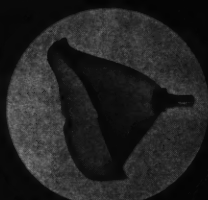
Masks for medium concentration



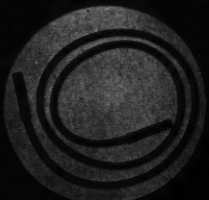
Masks for high concentration



Plastic Nasal Cannulae



Anatomical Face Cones



Plastic Oxygen Tubing



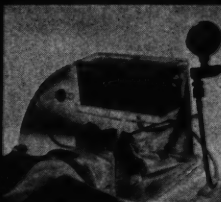
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Letters to the Editor

(Note: The following problem is just the sort of thing we need to air in this column, in order to let the membership see what each other's difficulties are. Discussion and suggestions are invited.)

April 2, 1956

Dear Sir:

There is a problem which confronts me which might be of interest to other therapists. In Wisconsin very few tents are used, and "nasal catheter" technique was used almost exclusively at our hospital. Once in a while a doctor would order a metal cannula. Since these were difficult to keep in place, we stocked plastic cannulas (Hudson) when they came on the market.

Before long, the majority of orders came for nasal cannula therapy, regardless of the fact that many of the patients are mouth breathers.

Before I ask for a hearing at a staff meeting, I would like documentary evidence with which to face the doctors. Can we do this in the Journal?

Sincerely,

(Miss) Dorothy Braeger, R.N.
Milwaukee Hospital

There is evidently a sort of mass psychology reaction at work here, which we have seen many times in other hospitals: as soon as one doctor orders something for one of his patients and it goes over well, *all* the rest of the staff immediately begin ordering the thing for all their patients, without regard to whether it is suitable or not. (Now of course not *all* of them do, but so it seems to the harrassed therapist!)

The particular case at hand is more flagrant than many, because even with patients who are *not* mouth breathers, the amount of oxygen you can give by cannula at reasonable flow rates is probably not much over 35%—vastly inadequate for a good full-blown myocardial infarction or acute pulmonary edema case. Therefore, it seems to us that if you get a chance

to plead your case with these doctors at all, that you should stress the concentration inadequacy more than the mouth-breathing versus nose-breathing angle.

What we need to keep before us is that usually the only way to get anything over 60% oxygen concentration is by mask, and that tents (except some new ones) seldom run over 50%, catheters about that or less, depending on flow rate, and cannulas definitely less than catheters—which, incidentally, makes them excellent for tapering-off therapy after a patient has been getting about 50% in a tent or by catheter.

Dr. Andrews' *Manual of Oxygen Therapy Techniques* says (page 122) that 6 to 8 liters per minute will give a concentration of 35% with a double cannula; Dr. Barach's *Physiologic Therapy in Respiratory Disease* says (page 321) that this flow will give closer to 45%. Neither author tells where this concentration is measured (i.e., where gas sample was taken—nose, trachea, etc.), but it is our opinion that the oxygen content of the inspired air reaching the alveoli will be closed to the more conservative figure, if not even less, in the average patient with a double cannula receiving 8 liters per minute of oxygen. This is because of excessive loss of oxygen around the end of the nose (the cannula tips dip into the nostrils not more than $\frac{1}{2}$ "), and also because of dilution with air entering the nostrils even when the mouth is closed.

—The Editor



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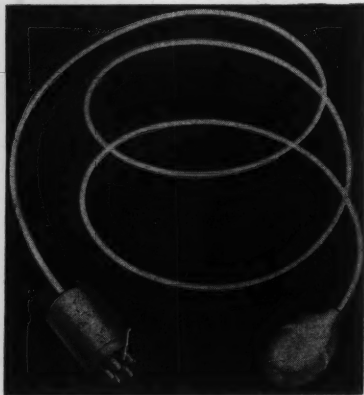
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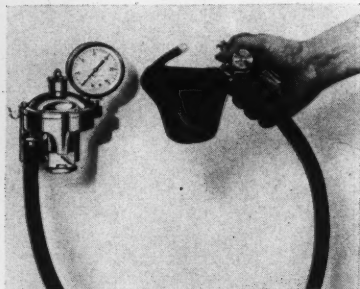
Nurse's Call Light Cord Safe for Use in Oxygen Tents. Sperti Faraday, Inc., of Adrian, Michigan, has introduced a new explosion-proof cord for use with Fara-



day Premier (Holtzer-Cabot) nurse call systems where the patient is in an oxygen tent. It is made to withstand repeated

drops without breakage, and can be autoclaved without injurious effect. The complete mechanism of this cord set (see illustration) is enclosed within the wall plug housing, and is actuated by slight pressure on the non-conductive bulb. The device can be reset by means of a button located on the wall plug. (Check No. 131)

Resuscitator for Oxygen Wall Outlets. The Ohio Chemical & Surgical Equipment Company, of Madison, Wisconsin, has introduced a lightweight and very



convenient resuscitator unit which attaches directly to any oxygen pipeline outlet. The inhaler assembly has an adjustable pressure relief valve, and provides for IPPB, with cycling manually controlled. The gauge (see cut) indicates the pressure in the resuscitation circuit, which is preselected within a range of 3 to 25 mm mercury, and adjusted by the automatic control knob. (Check No. 132)



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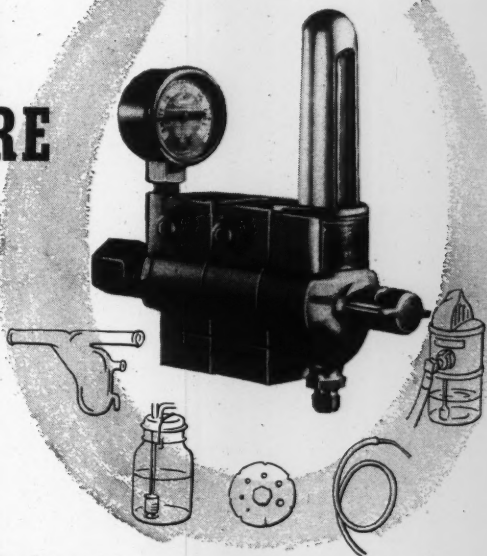
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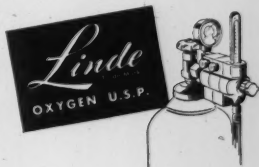
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INHALATION THERAPY ABSTRACTS

"Relief of CO₂ Narcosis by Simple IPP Therapy," by Theodore Noehren, M.D., in *Diseases of the Chest*, 28:515 (Nov. '55).

The author reviews the difficulties besetting the administration of oxygen to patients who are depending on their hypoxic drive to stimulate respiration which has been depressed by accumulation of excess CO₂ ("CO₂ Narcosis"). Giving oxygen in these cases usually further depresses the respiration, and may lead to coma and death.

Among the things tried to get around this difficulty are CO₂-O₂ mixtures (unsuccessful), progressively increasing concentrations of oxygen, chemicals which inhibit enzyme systems involved in conversion of CO₂ to carbonic acid and vice versa in the body, and hyperventilation. Of these, the hyperventilation is the most successful, but voluntary efforts of patients with chronic lung disease cannot produce sufficient tidal volume increase.

Accordingly, some workers have tried using iron lungs, and have found that these work very well. However, this method presents inconvenience in nursing care, and the other drawbacks of full tank respirators. Respirators of the demand valve type have been used with fairly good results, but when used with oxygen the patient may stop demanding, and hence require constant nursing supervision.

Dr. Noehren suggests that since the main problem here is getting rid of retained CO₂ by means of hyperventilating the patient, rather than one primarily of anoxia, there is enough oxygen in the air to suffice for the patient once a decent tidal exchange is accomplished. Therefore, if the IPPB machine is operated with compressed air instead of oxygen, there is not as much danger of stopping respirations by removing the anoxic drive, and of course the tidal volume is increased as much by using air as it would be using oxygen.

The carbon dioxide retention which emphysema causes has several effects. One, of course, is the change in sensitivity of the respiratory center that accounts for the vicious circle of more CO₂ retention. Another is pulmonary hypertension which can cause right heart failure ("cor pulmonale"). Hyperventilation, which in these cases Dr. Noehren thinks is best accomplished by IPPB with compressed air, rids the system of excess CO₂. This often helps lower the pulmonary hypertension, which in turn greatly relieves the failing right ventricle.

"Pulmonary Emphysema, Cardio-Respiratory Disturbance," by Hurley L. Motley, M.D., F.C.C.P., in *Diseases of the Chest*, 29:292 (March 1956).

This is an excellent article for the therapist who may be a little uncertain about Emphysema, as it gives much useful information on the subject, including what it is, how one can tell the degree of its severity in a patient, various diagnostic tests which reveal the extent of complications like pulmonary hyperten-

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sion which may be associated with it, methods of treatment, etc. It is not a complete and comprehensive treatment of the subject (which would require a book!), but gives rather more explanatory material than do many journal articles written primarily for the medical profession.

"The Vital Capacity of Children," by H. Everly Jones, in *Archives of Disease in Childhood*. 30:445 (Oct. '55).

This investigator has collected data on 324 boys and 301 girls of ages ranging from 6 to 13½ years, and carefully compared their heights, weights, and surface areas. Subjects selected were all normal school children who were not suffering any diseases or infections at time of the measurements.

(This table is a valuable reference for those who, for example, are dealing with children with paralytic polio who must be placed in respirators, because it gives a notion of about what the vital capac-

ity of a child should be for a given weight, height or surface area, and hence gives also an indication of the degree of respiratory impairment that may be present at any stage of the disease process. —Ed.)

"Intermittent Positive Pressure Breathing," by Drs. Leslie, Dantes and Roslove, in *JAMA* 160:1125 (31 Mar. '56).

A group of patients with pulmonary emphysema, fibrosis, bronchiectasis or atelectasis were treated with three bronchodilators (Insuprel, Aerolone and Antrenyl) nebulized by aerosol generators. The aerosols were given four times a day: twice with IPPB and twice without. Quantitative data were obtained. They could not show that the IPPB enhanced the effect of the bronchodilators.

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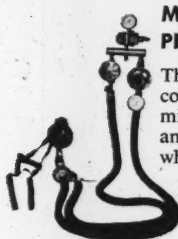
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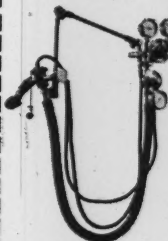
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